



Fast Track Troubleshooting

Model:
RF23J9011**/AA

IMPORTANT SAFETY NOTICE – “For Technicians Only” This service data sheet is intended for use by persons having electrical, electronic, and mechanical experience and knowledge at a level generally considered acceptable in the appliance repair trade. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible, nor assume any liability for injury or damage of any kind arising from the use of this data sheet.

wsRF23J9011 Production Date 06/15/2015

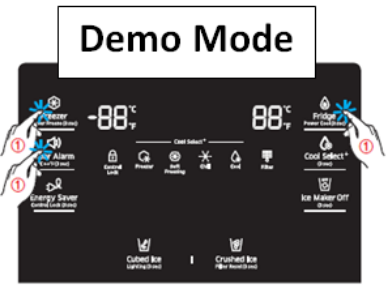
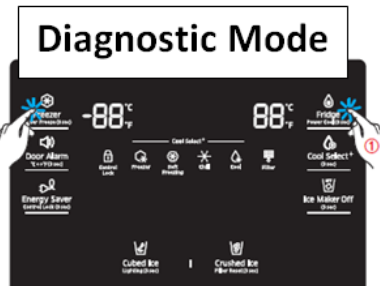
Support Information:

HELP: 1-888-751-4086 (Tech Sup. – ASC/SSD)

1-866-894-0637 (Tech Sup. - FE/ME)

GSPN: <http://gspn3.samsungcsportal.com/main.jsp>

PLUS ONE: <http://my.plus1solutions.net/clientPortals/samsung>



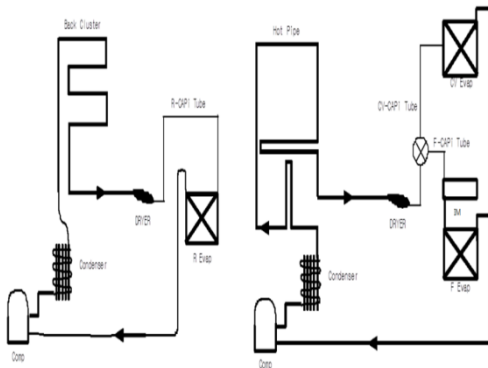
Hold **Freezer** and **Cool Select** buttons together until you see a blank screen, then press any button until FF is shown.

Press any button to change to next step

- FF** F compressor runs, all fans run
- Of c** F compressor runs, C S fan off
- Fr** R & F compressors run, all fans run
- Fd** Forced Defrost, all sections
- Blank Screen** Wait 30 seconds to exit mode



Two Complete Sealed Systems



Fridge room

Freezer room

Hold **Freezer** and **Fridge** buttons together, screen blinks then stops. Release the buttons and check for codes.

If code is displayed, refer to chart.

Blank screen = no errors

Do not touch screen for 30 seconds

Hold **Freezer**, **Fridge** and **Door Alarm** Buttons together until O-FF appears. This indicates unit is in Demo Mode.

In Demo Mode, cooling is OFF.

Component	Resistance	Wattage	Voltage
Freezer Defrost Heater	62.6Ω	230	120vac
Cool Select Defrost Heater	62.6Ω	230	120vac
French Mullion Heater	1446Ω	10	120vac
Ice Duct Heater	2057Ω	7	120vac
Dispenser Heater	5760Ω	2.5	120vac
Ice Maker Heater	93Ω	156	120vac
Pantry Damper	144Ω	1	12vdc
Sensors	2.5kΩ-89kΩ	N/A	1~4.5vdc
Fans	N/A	N/A	7~12vdc

DC FAN MOTORS

Brushless DC Fan motors are used to save energy. The fans operate at two speeds. Fan speed information is read by the Main PCB. If the fan speed exceeds 600 RPM or the speed is too slow, or stopped the fan drive circuit is disabled, After 10 seconds the circuit tries again with 3 seconds of DC voltage. If the fan continues this activity for 5 cycles, 10 seconds off 3 seconds on, the fan drive circuit is disabled for 10 minutes.

TO TEST THE FAN CIRCUIT VOLTAGE.

Power off and back on to check the DC voltage to the motor, wait from 10 to 60 seconds for the fan voltage to kick in, and then check fan voltage, the average reading is 9 VDC. If you get 3 seconds of voltage every 10 seconds for the 5 fan power up cycles, then the Main PCB is good.

NOTE: You may need to put unit in FORCED FREEZE mode to activate the fans/compressor.

If the fan blade is blocked by ice, then defrost and check the motor again, after removing power from the unit.

If the evaporator is ice blocked and thus blocking the air flow, the fan will over RPM and is stopped. Remove ice and check the motor again. If everything is clear around the fan blade then the motor would be at fault. Continuous fan errors will be displayed on the front panel display. **PLEASE NOTE:** The door switches control the evaporator fan motors. Have them closed to test the motors. Delay time 10 – 60 seconds.

Heat Release Ice Makers

Heat Release Ice Production Explanation

23-43 minutes after the water fill is complete, the control board will check the temperature of the Eject Thermistor, on the Ice Maker head. If the Thermistor reads a temperature lower than 8.5 degrees for more than 5 seconds, the ice production process is completed. The Ice maker will harvest if the ice bucket is not sensed as full. If a Fault Mode is detected with the Ice Maker operation, the Ice Maker stops working for 3 hours, which means the Ice Maker checks the operation every 3 hours until it works properly.

Heat Release I/M Test Mode

Press and hold the Ice Maker Test Switch for at least 1.5 seconds and the harvest function will start. If the Ice Maker Thermistor is below 0 degrees, the Ice Maker heater turns on for about 2 minutes. If the temperature exceeds 0 degrees, the Ice Maker heater turns on for 30 seconds. After the Ice maker heater turns on for 30 seconds, the heater turns off and then Ice Maker harvest motor turns on. The motor will rotate in right direction for about 3 minutes, after this, water supply valve is turned on, then the valve is turned off, the test mode is completed. If the above operation is not carried out within 6 minutes, it will go into a fault mode.

Temperature/Resistance/Voltage Chart for Samsung Refrigerators Sensors

Temp.	(Ω)	Volts	Temp.	(Ω)	Volts	Temp.	(Ω)	Volts	Temp.	(Ω)	Volts
-29.2°F	64227	4.326	1.4°F	28021	3.685	32.0°F	13290	2.853	62.6°F	6771	2.019
-27.4°F	61012	4.296	3.2°F	26760	3.64	33.8°F	12749	2.802	64.4°F	6521	1.974
-25.6°F	57977	4.264	5.0°F	25562	3.594	35.6°F	12233	2.751	66.2°F	6281	1.929
-23.8°F	55112	4.232	6.8°F	24425	3.548	37.4°F	11741	2.7	68.0°F	6052	1.885
-22.0°F	52406	4.199	8.6°F	23345	3.501	39.2°F	11271	2.649	69.8°F	5832	1.842
-20.2°F	49848	4.165	10.4°F	22320	3.453	41.0°F	10823	2.599	71.6°F	5621	1.799
-18.4°F	47431	4.129	12.2°F	21345	3.405	42.8°F	10395	2.548	75.2°F	5225	1.716
-16.6°F	45146	4.093	14.0°F	20418	3.356	44.6°F	9986	2.498	77.0°F	5000	1.675
-14.8°F	42984	4.056	15.8°F	19537	3.307	46.4°F	9596	2.449	78.8°F	4861	1.636
-13.0°F	40938	4.018	17.6°F	18698	3.258	48.2°F	9223	2.399	80.6°F	4690	1.596
-11.2°F	39002	3.98	19.4°F	17901	3.208	50.0°F	8867	2.35	86.0°F	4218	1.483
-9.4°F	37169	3.94	21.2°F	17142	3.158	51.8°F	8526	2.301	87.8°F	4072	1.447
-7.6°F	35433	3.899	23.0°F	16419	3.107	53.6°F	8200	2.253	89.6°F	3933	1.412
-5.8°F	33788	3.858	24.8°F	15731	3.057	55.4°F	7888	2.205	91.4°F	3799	1.377
-4.0°F	32230	3.816	26.6°F	15076	3.006	57.2°F	7590	2.158	95.0°F	3547	1.309
-2.2°F	30752	3.773	28.4°F	14452	2.955	59.0°F	7305	2.111	96.8°F	3428	1.277
-0.4°F	29350	3.729	30.2°F	13857	2.904	60.8°F	7032	2.064	100.4°F	3204	1.213

Make sure before measuring voltage of any DC component that circuit ground is used. Any marked GND on the main PCB will be your circuit ground. If Chassis ground is used, measurements will be incorrect.

Sensor Res. > 100KΩ = Open

Sensor Res. < 2KΩ = Shorted

A Sensor Resistance over 100K ohm is considered OPEN
A Sensor Resistance under 2K ohm is considered SHORTED

Note: A sensor could also give wrong values if it is out of tolerance

Error Code	Item	Trouble contents	Diagnostic method
1E	Freezer Sensor	The sensor housing separating, incomplete contact, open-circuited wire, short-circuit and abnormal temperature errors are displayed when the temperature measured by the sensor is +50 °C or higher or -50 °C or lower.	The voltage between the Main PCB CN30 pins 1 and 3 should be within the 4.5V~1.0V range.
2E	Fridge Sensor		The voltage between the Main PCB CN30 pins 1 and 5 should be within the 4.5V~1.0V range.
4E	Freezer compartment defrosting sensor		The voltage between the Main PCB CN30 pins 1 and 4 should be within the 4.5V~1.0V range.
5E	Fridge compartment defrosting sensor		The voltage between the Main PCB CN30 pins 1 and 6 should be within the 4.5V~1.0V range.
6E	External air sensor		The voltage between the Main PCB CN30 pins 1 and 2 should be within the 4.5V~1.0V range.
9E	Cool Select Room sensor		The voltage between the Main PCB CN30 pins 11 and 12 should be within the 4.1V~0.8V range.
11E	Cool Select Room defrosting sensor		The voltage between the Main PCB CN30 pins 11 and 13 should be within the 4.1V~0.8V range.
13E	Humidity sensor	This error is displayed while the corresponding fan motor is operating and a feedback signal line contact error, motor wire separation or motor error occurs.	The voltage between the Main PCB CN30 pins 7 and 9 should be within the 4.1V~0.8V range.
14E	Ice Maker (Fridge) Sensor Error	Connector Slipped-Out or Open-Contact, Wire Cut or Short-Circuited, Abnormal Sensing Temp : higher than 149°F (+65°C) or lower than -58°F (-50°C)	The voltage between MAIN PCB CN90 3↔8 should be within 4.5V~1.0V.
15E	Ice Maker Sensor Error		The voltage between MAIN PCB CN30 10↔11 should be within 4.5V~1.0V.
16E	Fridge humidity sensor	This error is displayed while the corresponding fan motor is operating and a feedback signal line contact error, motor wire separation or motor error occurs.	The voltage between the Main PCB CN30 pins 7 and 8 should be within the 4.1V~0.8V range.
21E	Freezer Fan Error	The error is displayed while the corresponding fan motor is operating and a feedback signal line contact error, motor wire separation or motor error occurs.	The voltage of the MAIN PCB CN75 1↔4: should be between 7V~12V.
22E	Fridge Fan Error		The voltage of the MAIN PCB CN75 1↔3: should be between 7V~12V.
23E	C-Fan Error		The voltage of the MAIN PCB CN75 1↔2: should be between 7V~12V.

Error Code	Item	Trouble contents	Diagnostic method
24E	Freezer Defrosting Error	The separation of the freezer compartment defrosting heater housing part, contact error, disconnection, short circuit or temperature fuse error. One of these error codes is displayed if the defrosting operation of the freezer or Cool Select Room does not finish even after the continuous heating operation has been performed for 120 minutes.	After separating the MAIN PCB CN70 wire from the PCB, check the resistance between CN70 7 and 1. (For the resistance value, refer to the electric wiring diagram). For 0 Ohm, check if the heater is short-circuited. For ∞ Ohm, check if the wire or temperature fuse is open-circuited.
29E	Cool Select Room defrosting Error		After separating the MAIN PCB CN70 wire from the PCB, check the resistance between CN70 3 and 1. (For the resistance value, refer to the electric wiring diagram). For 0 Ohm, check if the heater is short-circuited. For ∞ Ohm, check if the wire or temperature fuse is open-circuited.
31E	Cool Select Room Fan Error	One of these error codes is displayed in case of the feedback signal line contact error, the motor wire separation or the motor error when the fan motor starts to run.	The voltage of the MAIN PCB CN75 1↔6: should be between 7V-12V.
39E	Ice Maker (Fridge) Function Error	It occurs when there is a defect in removing ice cubes or in making it paralleled [When there is an error while doing self-diagnosis of the Initial Motor Rotation.]	After replacing the Ice Maker (Fridge), plug in the Fridge and check if the Ice Maker operates normally
40E	Ice Maker Fan Error	When the related Fan Motor operates, it occurs if the contact of the Feed Back Signal Wire is defective, the Motor Wire is slipped out or the Motor is defective.	The voltage between MAIN PCB CN50-"8(GRY) ↔ 15(BLU)" should be 12V.
41E	Main↔Panel Error	A communications error between the Main and the Panel PCBs	Since an oscilloscope is required for the examination, it is recommended replacing the Main PCB and then checking the problem again.
61E	Fridge Ice Duct Heater Error	Connector Slipped-Out or Open-Contact, Wire Cut or Short-Circuited, Defective Thermistor	Remove the MAIN PCB CN52 and CN79 connectors from the MAIN PCB and read the continuity between CN52 #5 ↔ CN79 #3. (Refer to the Block Diagram for the Resistance Value.) When it reads 0 Ohm, check the Heater short and when it reads ∞ Ohm, check if the Wire is open or slipped out.
65E	Fridge Ice Bucket Heater Error		Remove the MAIN PCB CN52 and CN79 connectors from the MAIN PCB and read the continuity between CN52 #1 ↔ CN79 #3. (Refer to the Block Diagram for the Resistance Value.) When it reads 0 Ohm, check the Heater short and when it reads ∞ Ohm, check if the Wire is open or slipped out.
66E	Door Handle Heater Error	Door Handle Heater Open Error	After separating the MAIN PCB CN51 and CN76 wires from the PCB, check the resistance between CN51 9 and CN76 2. (For the resistance value, refer to the electric wiring). For 0 Ohm, check if the heater is short-circuited. For ∞ Ohm, check if the wire is open-circuited or not connected.
71E	The F compartment abnormal high temperature Indicator blinks	When the freezer temperature is abnormally high or the freezer door is open for a certain period of time and the freezer temperature increases, the freezer display blinks.	The temperature has been abnormally increased. Check if the door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a pre-determined period of time.
72E	The R compartment abnormal hightemperature Indicator blinks	When the freezer temperature is abnormally high or the fridge door is open for a certain period of time and the fridge temperature increases, the fridge display blinks.	Check if the door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a pre-determined period of time.

Error Code	Item	Trouble contents	Diagnostic method
81E	F Comp start failure error	The error code is displayed when the compressor has failed to start.	Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check if the DC 15V output is less than 13.5V. Check the Comp and Cycle.
82E	F Comp IPM Fault Error	The error code is displayed when the compressor IPM fault error has occurred.	
83E	F Comp location detection error	The error code is displayed when the compressor location detection failed.	Check the compressor wire connections. Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check the Comp and Cycle.
84E	F Comp motor constraint error	The error code is displayed when the compressor motor is constrained.	Check if the compressor and the Cycle is normal. Check the input voltage. Check the soldering of the inverter PCB. (Check if any parts have short-circuited.)
85E	F Comp low voltage error	The error code is displayed when the AC Input Voltage is too low.	Check the input voltage. (This error occurs when the input voltage is AC 106 V or lower.)
86E	F Comp over voltage error	The error code is displayed when the AC Input Voltage is too high.	Check the input voltage. (This error occurs when the input voltage is AC 310V or higher.)
87E	R Comp start failure error	The error code is displayed when the compressor has failed to start.	Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check if the DC 15V output is less than 13.5V. Check the Comp and Cycle.
88E	R Comp IPM fault error	The error code is displayed when the compressor IPM fault error has occurred.	
89E	R Comp location detection error	This error code is displayed when an abnormal current is detected in the compressor.	Check the compressor wire connections. Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check the Comp and Cycle.
90E	R Comp motor constraint error	The error code is displayed when the compressor motor is constrained.	Check if the compressor and the Cycle is normal. Check the input voltage. Check the soldering of the inverter PCB. (Check if any parts have shortcircuited.)
91E	R Comp low voltage error	The error code is displayed when the AC Input Voltage is too low.	Check the input voltage. (This error occurs when the input voltage is AC 106 V or lower.)
92E	R Comp over voltage error	The error code is displayed when the AC Input Voltage is too high.	Check the input voltage. (This error occurs when the input voltage is AC 310V or higher.)

- CN70
- 1: COM1
 - 3: COM1
 - 5: FRENCH-HET
 - 7: CV-DEF-HET
 - 9: F-DEF-HET

- CN71
- 3: I/M-HET
 - 5: ICE-SOL VALVE
 - 7: W/T-SOL VALVE

- CN73
- 1: ICE ROUTE MOTOR
 - 3: AUGER MOTOR
 - 5: CUBE SOL VALVE

- CN13
- 1: RX
 - 2: GND
 - 3: TX
 - 4: nRESET
 - 5: 12V
 - 6: 5V

- CN76
- 1: FLAM LED
 - 2: GND
 - 3: R-LAMP LED
 - 4: CV-LAMP LED
 - 5: GND
 - 6: 13V
 - 7: STEP MOTOR VLAVE
 - 8: STEP MOTOR VLAVE
 - 9: STEP MOTOR VALVE
 - 10: STEP MOTOR VLAVE

- CN52
- 1: ICE -FAN
 - 2: GND
 - 3: GND

- CN51
- 1: 13V
 - 2: HANDLE HEATER
 - 3: HANDLE HEATER
 - 4: 13V
 - 5: ICE ROOM HEATER
 - 6: ICE DRAIN HEATER

- CN12
- 1: RX
 - 2: GND
 - 3: TX
 - 4: NC
 - 5: 12V
 - 6: 5V

- CN11
- 1: 13V
 - 2: 13V
 - 3: GND
 - 4: GND
 - 5: 5V
 - 6: 5V
 - 7: GND
 - 8: TX
 - 9: RX
 - 10: 5V
 - 11: GND
 - 12: TX
 - 13: RX

- CN74
- 1: GND
 - 2: F-FAN
 - 3: R-FAN
 - 4: F-FNA
 - 5: CV-FAN
 - 6: C-FAN
 - 7: ICE-FG
 - 8: CV-FG
 - 9: F-FG
 - 10: R-FG
 - 11: C-FG

- CN40
- 1: WATER LEVER
 - 2: ICE LEVER
 - 5: ICE ROUTE1
 - 6: ICE ROUTE2

- CN50
- 1: TX
 - 2: RX
 - 3: 13V
 - 4: 5V
 - 5: GND
 - 6: R-DOOR S/W
 - 7: F-DOOR S/W
 - 8: GND
 - 9: GND

- CN90
- 1: IN_B
 - 2: IN_A
 - 3: SEN
 - 4: TEST SW
 - 5: FULL SW
 - 6: HOR SW
 - 7: IR SENSOR
 - 8: 5V
 - 9: GND
 - 10: 13V
 - 11: VCC
 - 12: VCC
 - 13: FLOW SENSOR OUT

- CN30
- 1: GND
 - 2: EXT-SENSOR
 - 3: F-SENSOR
 - 4: F-DEF-SENSOR
 - 5: R-SENSOR
 - 6: R-DEF-SENSOR
 - 7: GND
 - 8: GND
 - 9: CV-SENSOR
 - 10: CV-DEF-SENSOR
 - 11: HUMIDITY-SENSOR1
 - 12: HUMIDITY-SENSOR2
 - 13: ICE ROOM-SENSOR
 - 14: CV-DOOR S/W



The LED blinking frequency depending on the protection functions

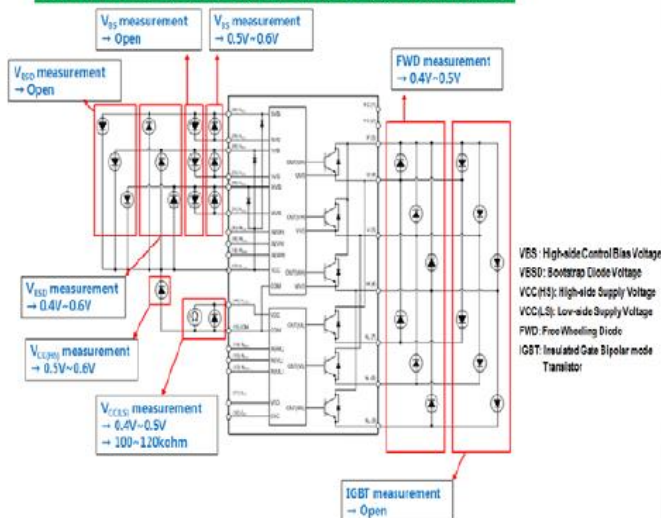
If the Failure Condition is detected while the compressor is operating, stop the Compressor operating immediately and wait for 5 minutes. During these 5 minutes, the RPM command signal is not available. Even if the RPM command that orders the compressor to run is sent, the compressor does not work and keep standing by.

The LED is tuned on for 1 second and then off for 2 seconds.

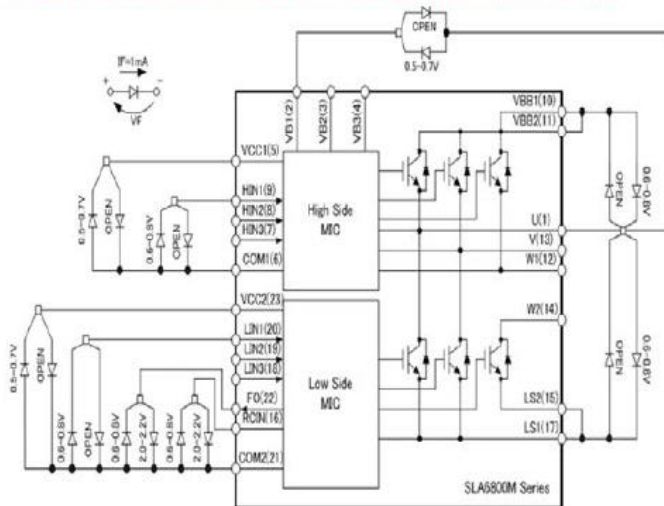
LED Blinking Frequency	Protecting Functions	Remarks
	Normal Operation	N/A
	Starting Failure	1. Check the COMP terminals short(U,V,W) 2. Check IPM Pins short of Inverter PBA 3. Check IPM operating Voltage(under DC 13.5V) 4. Other cases, check the COMP, cycle, etc.
	SPM Fault	
	Abnormal Current Detection	1. Check COMP wire connections(U,V,W) 2. Check PCB Bottom side soldering state 3. Other cases, check the COMP, cycle, etc.
	Motor Locked / Over RPM	1. Check PCB Bottom side soldering state. 2. Check Input voltage oscillation 3. Other cases, check the COMP, cycle, etc.
	Under Voltage	1. Check input voltage under AC 53V(Input Power AC110~127V) or AC 106V(Input Power AC 220 ~ 240V) 2. Check PCB Bottom side soldering state.
	Over Voltage	1. Check input voltage over AC 155V(Input Power AC110~127V) or AC 310V(Input Power AC 220 ~ 240V) 2. Check PCB Bottom side soldering state.

The LED blinking frequency depending on the protection functions If the blinking continues, after 5 minutes, please refer to the remarks in the table above.

SPM FREEWHEELING DIODE VOLTAGE VALUE (F Room Inverter LC3-3A)



The SPM FREEWHEELING DIODE VOLTAGE VALUE (R Room Inverter LC4)



(F Room Inverter, LC3-3A)

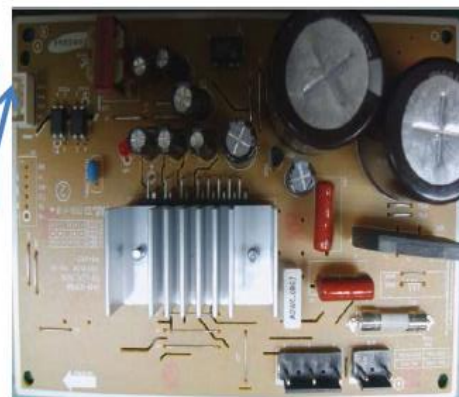


AC Power (AC 110V)
Comp OLP

①: U Phase
③: V Phase
⑤: W Phase

- ①②: DC 13.2V
- ③: DC 5V
- ④⑤: GND
- ⑥: Comp RPM Signal
- ⑦: Comp Feedback

(R Room Inverter, LC4)



- ①③: AC Power (AC 110V)
- ⑤: U Phase
- ⑦: V Phase
- ⑨: W Phase

- ①: DC 5V
- ②: GND
- ③: Comp RPM
- ④: Comp Feedback

